

# Claims

- [c1] 1.A focal spot sensing device comprising:  
a housing that resists x-ray beams;  
an opening disposed in a wall of the housing that allows an x-ray beam to enter the housing; and  
a sensor device disposed in the housing that interprets a position of the x-ray beam for calculating a position of a focal spot.
- [c2] 2.The device of claim 1, wherein the opening is sized so that the x-ray beam strikes the sensor device.
- [c3] 3.The device of claim 1, wherein the opening is sized such that the x-ray beam at a surface of the sensor device is less than a total sensitive area of the sensor device.
- [c4] 4.The device of claim 1, wherein the sensor device includes at least two detector elements arranged next to each other.
- [c5] 5.The device of claim 4, wherein the at least two detector elements include a scintillator and a photodiode.
- [c6] 6.The device of claim 1, wherein the sensor device in-

cludes a fluorescent screen, which faces the opening so that the x-ray beam strikes the fluorescent screen, and a position sensitive photodiode that is arranged between the fluorescent screen and a back wall of the housing.

- [c7] 7.The device of claim 6, wherein the opening is dimensioned to be approximately a pinhole.
- [c8] 8.The device of claim 6, wherein the fluorescent screen is optically coupled to the position sensitive photodiode.
- [c9] 9.The device of claim 8, wherein the fluorescent screen is optically coupled to the position sensitive photodiode by a transparent epoxy layer.
- [c10] 10.The device of claim 1, further comprising a control mechanism in electronic communication with the sensor device.
- [c11] 11.The device of claim 10, wherein the control mechanism calculates the focal spot movement and compensates for detector response error induced by focal spot movement.
- [c12] 12.A focal spot sensing device comprising:
  - a housing that resists x-ray beams;
  - an opening disposed in the housing that allows an x-ray beam to enter the housing; and

means for calculating a position of a focal spot.

[c13] 13.The device of claim 12, wherein the opening is sized so that the x-ray beam strikes the means for calculating.

[c14] 14.The device of claim 12, wherein the opening is sized such that the x-ray beam at a surface of the means for calculating is less than a total sensitive area of the means for calculating.

[c15] 15.The device of claim 12, wherein the means for calculating includes at least two detector elements arranged next to each other and the opening is sized so that the x-ray beam strikes the at least two detector elements.

[c16] 16.The device of claim 12, wherein the means for calculating includes a fluorescent screen, which faces the opening so that the x-ray beam strikes the fluorescent screen, and a position sensitive photodiode that is arranged between the fluorescent screen and a back wall of the housing; and the opening is dimensioned to be approximately a pinhole.

[c17] 17.The device of claim 16, wherein the fluorescent screen is optically coupled to the position sensitive photodiode by a transparent epoxy layer.

[c18] 18.The device of claim 12, further comprising a control

mechanism in electronic communication with the means for calculating a position of a focal spot.

[c19] 19.The device of claim 18, wherein the control mechanism calculates the focal spot movement and compensates for detector response error induced by focal spot movement.

[c20] 20.An imaging system comprising:  
an x-ray source that produces an x-ray beam and has a focal spot;  
a detector array that receives the x-ray beam and includes a focal spot sensing device, the focal spot sensing device includes: a housing that resists x-ray beams; an opening disposed in a wall of the housing that allows the x-ray beam to enter the housing; and a sensor device disposed in the housing that interprets a position of the x-ray beam for calculating a position of the focal spot.

[c21] 21.The device of claim 20, wherein the opening is sized so that the x-ray beam strikes the sensor device.

[c22] 22.The device of claim 20, wherein the opening is sized such that the x-ray beam at a surface of the sensor device is less than a total sensitive area of the sensor device.

[c23] 23.The device of claim 20, wherein the sensor device in-

cludes at least two detector elements arranged next to each other and the opening is sized so that the x-ray beam strikes the at least two detector elements.

[c24] 24.The device of claim 20, wherein the sensor device includes a fluorescent screen, which faces the opening so that the x-ray beam strikes the fluorescent screen, and a position sensitive photodiode that is arranged between the fluorescent screen and a back wall of the housing; and the opening is dimensioned to be approximately a pinhole.

[c25] 25.The device of claim 24, wherein the fluorescent screen is optically coupled to the position sensitive photodiode by a transparent epoxy layer.

[c26] 26.The system of claim 20, further comprising a control mechanism in electronic communication with the detector array and the x-ray source.

[c27] 27.A method for sensing a focal spot, the method comprising:  
receiving an x-ray beam into an opening of a focal spot sensing device;  
interpreting a position of the x-ray beam; and  
calculating a position of a focal spot.

[c28] 28.The method of claim 27, further comprising calibrat-

ing a CT system detector response to the position of a focal spot.

[c29] 29.The method of claim 27, further comprising receiving the x-ray beam at a sensor device disposed in the focal spot sensing device, the sensor device includes at least two detector elements arranged next to each other.

[c30] 30.The method of claim 27, further comprising receiving the x-ray beam at a sensor device disposed in the focal spot sensing device, the sensor device includes a fluorescent screen, which faces the opening so that the x-ray beam strikes the fluorescent screen, and a position sensitive photodiode that is arranged between the fluorescent screen and a back wall of the focal spot sensing device.